MULTIPLE-FOLD PORTABLE ELECTRONIC DEVICE

FIELD

[0001] This specification relates to portable electronic devices and more particularly relates to a multiple-fold portable electronic device.

BACKGROUND

[0002] Portable electronic devices are ubiquitous because their applications are seemingly limitless Some examples of portable electronic devices are cell phones, smartphones, email paging devices, Personal Digital Assistants (PDA), audio players, video players, video cameras, still cameras, and portable video games. Increasingly, the functionalities of foregoing are being incorporated into single multifunction electronic devices. One challenge in designing a multi-function electronic devices is to increase the operable surface used for input and output devices, such as display screens, keyboards, trackwheels, cameras, and touch screens. Yet, in maximizing the operable surface, care is also needed to reduce the volume of the device so as to maintain portability. A popular solution is a flip device that pivotally attaches a screen to a keyboard. In use, the flip device is flipped open to expose the screen and the keyboard. In storage, the device is closed like a clam with the screen facing the keyboard. However, as the functionalities of multifunction devices increases, flip devices can prove limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. **1** is a perspective view of a double-fold portable electronic device in an open position;

[0004] FIG. **2** is a perspective view of the double-fold portable electronic device of FIG. **1** in a disassembled state;

[0005] FIG. **3** is a perspective view of the double-fold portable electronic device of FIG. **1** in a shut position;

[0006] FIG. **4** is a side view of the double-fold portable electronic device of FIG. **1** transitioning between the open and shut positions;

[0007] FIG. **5** is a perspective view of the double-fold portable electronic device of FIG. **1** in an intermediate position;

[0008] FIG. **6** is a perspective view of the double-fold portable electronic device of FIG. **1** in another intermediate position;

[0009] FIG. **7** is a block diagram of certain internal components within the electronic device of FIG. **1**;

[0010] FIG. **8** is a perspective view of another embodiment of a double-fold portable electronic device of FIG. **1**.

[0011] FIG. **9** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0012] FIG. **10** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0013] FIG. **11** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0014] FIG. **12** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0015] FIG. **13** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0016] FIG. **14** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

[0017] FIG. **15** is a perspective view of a further embodiment of a double-fold portable electronic device of FIG. **1**.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0018] Referring to FIGS. **1**, **2**, **3**, and **4**, a double-fold portable electronic device in accordance with a first embodiment is generally indicated at **100**. Double-fold portable electronic device **100** has an open position (shown in FIG. **1**) and a shut position (shown in FIGS. **3** and **4**). Double-fold portable electronic device **100** has a first planar housing **105**, a second planar housing **110**, and a third planar housing **115**. Each planar housing **105**, **110**, **115** is a hexahedron. First planar housing **105** has a first surface **120**, a second surface **125**, a first side **130**, a second side **135**, and a first recess **140** situated in second side **135**. Second planar housing **110** has a third surface **145**, a fourth surface **150**, a third side **155**, a fourth side **160**, a second recess **165** situated in third side **155**, and a third recess **170** situated in fourth side **160**. Third planar housing **115** has a fifth surface **175**, a sixth surface **180**, a fifth side **185**, a sixth side **190**, and a fourth recess **195** situated in fifth side **185**. First planar housing **105** is connected to second planar housing **110** via a first joint **200**. First joint **200** is situated in the first recess **140** and second recess **165**. Second planar housing **110** is connected to third planar housing **115** via a second joint **205**.

[0019] Referring to FIG. **2**, to illustrate joints **200**, **205** and their connections to housings **105** **110**, **115** in more detail, double-fold portable electronic device **100** is shown with housings **105**, **110**, **115** detached from joints **200**, **205**. First joint **200** comprises a first body **207**, a first hinge **210**, a second hinge **215**, a third hinge **220**, and a fourth hinge **225**. First body **207** has a lateral cross-section of an elongated C formed by a first rounded side **230** and a first flat side **235** (best seen in FIG. **3**). First body **207** comprises a first end **240** and a second end **245**. First hinge **210** and second hinge **215** extend from first end **240**. Third hinge **220** and fourth hinge **225** extend from second end **245**. Second joint **205** comprises a second body **250**, a fifth hinge **255**, a sixth hinge **260**, a seventh hinge **265**, and a eighth hinge **270**. Second body **250** has a lateral cross-section of an elongated C formed by a second rounded side **275** (best seen in FIG. **4**) and a second flat side **280**. Second body **250** comprises a third end **285** and fourth end **290**. Fifth hinge **255** and sixth hinge **260** extend from third end **285**. Seventh hinge **265** and eighth hinge **270** extend from fourth end **290**.

[0020] First recess **140** has a first wall **295** and a second wall **300**. First wall **295** comprises a first pivot **305**. Second wall **300** comprises a second pivot **310**. Second recess **165** comprises a third wall **315** and a fourth wall **320**. Third wall **315** comprises a third pivot **325**. Fourth wall **320** comprises a fourth pivot **330**. Third recess **170** comprises a fifth wall **335** and a sixth wall **340**. Fifth wall **335** comprises a fifth pivot **345**. Sixth wall **340** comprises a sixth pivot **350**. Fourth recess **195** comprises a seventh wall **355** and eighth wall **360**. Seventh wall **355** comprises a seventh pivot **365**. Eighth wall **360** comprises an eighth pivot **370**.

[0021] First joint **200** is attached to first planar housing **105** via the mating of first hinge **210** with first pivot **305** and third hinge **220** with second pivot **310**. First Joint **200** is attached to second planar housing **110** via the mating of second hinge **215** with third pivot **325** and fourth hinge **225** with fourth pivot **330**. Second joint **205** is attached to second planar housing **110** via the mating of fifth hinge **255** with fifth pivot **345** and seventh hinge **265** with sixth pivot **350**. Second joint **205** is attached to third planar housing **115** via the mating of sixth hinge **260** with seventh pivot **365** and eighth hinge **270** with eighth pivot **370**.